B.Tech.(A.E)
# FLUID MECHANICS AND MACHINERY
Roll No_____
Subject Code: BTAE-403
Total no of page-2

Time: 3 hrs   MAY-2014   **Max Marks: 60**

NOTE:

1. **Section A is compulsory consisting of 10 questions each carrying 2 marks.**
2. **Section B contains five questions each carrying 5 marks. Attempt any 4 questions.**
3. **Section C contains 3 questions each carrying 10 marks. Attempt any 2 questions.**

Section-A   *(2x10)*

Q1. Write briefly:
   a) What is an ideal fluid.
   b) Differentiate between Newtonian fluid and Non-Newtonian fluid.
   c) Define the terms buoyancy and centre of buoyancy.
   d) Differentiate between path line and stream line.
   e) Write the Bernoulli's equation .
   f) What do you mean by kinematic and dynamic similarity.
   g) What is dimensional homogeneity.
   h) What is a laminar flow.
   i) What is the significance of Darcy equation.
   j) What is a pitot tube.

Section-B   *(5x4)*

Q2. A uniform body of size 3m long x2m wide x 1m deep floats in water. What is the weight if the depth of immersion is 0.8m .Also determine the meta centric height.

Q3. The stream function for a two dimensional flow is given by $\Psi=2xy$.calculate the velocity at the point P(2,3).Find the velocity potential function Φ.

Q4. State the Bernoulli's theorem for steady flow of an incompressible fluid. Derive an expression for Bernoulli's equation from first principle and state the assumptions made. .

Q5. Define and explain the terms (i)Hydraulic gradient line (ii)Total energy line.

Q6. With the help of a neat sketch explain the working of a venturimeter. Derive an expression for the discharge through a venturimeter.

Section-C *(2x10)*

Q7. State Buckingham's π-theorem. The efficiency η of a fan depends on density ρ,dynamic viscosity μ of the fluid,angular velocity ω, diameter D of the rotor and the discharge Q.Express η in terms of dimensionless parameters.

Q8.(a)What are the different energy losses in pipes.
(b) An oil of kinematic viscosity 0.4 is flowing through a pipe of diameter 300mm at the rate of 300litres/s. Find the head loss due to friction for a length of 50m of pipe.

Q9. Write a short note on any two (i) Hydraulic accumulator (ii)Hydraulic intensifier (iii)gear pump.

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